DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Notice of 12-Month Finding on Petition to List Cagle's Map Turtle

AGENCY: Fish and Wildlife Service, Interior.

ACTION: 12-month petition finding.

SUMMARY: The Fish and Wildlife Service (Service) announces a 12-month finding for the petition to add the Cagle's map turtle (*Graptemys caglei*) to the List of Endangered and Threatened Wildlife and Plants. The Cagle's map turtle is currently found only in the Guadalupe River system in southeast-central Texas in Kerr, Kendall, Comal, Guadalupe, Gonzales, Dewitt, and Victoria Counties. The Cagle's map turtle is threatened by habitat loss due to reservoir construction, water diversions, water quality degradation, and by human depredation (collecting for pet trade and intentional shootings). Information has been presented that the petition to list Cagle's map turtle is warranted but precluded by listing actions of higher priority. Because the threat to the species is not imminent, Cagle's map turtle is not proposed for listing at this time.

DATES: The finding announced in this notice was made on January 4, 1993.

ADDRESSES: Information, comments, or questions concerning this petition should be sent to the State Office Supervisor, Texas State Office, U.S. Fish and Wildlife Service, 611 East 6th Street, Room 407, Austin, Texas 78701. The petition, petition finding, and supporting data are available for public inspection by appointment, during normal business hours, at the above address.

FOR FURTHER INFORMATION CONTACT: Patrick Connor, Fish and Wildlife Biologist, at the above address (telephone 512/482-5436).

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(B) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), requires that, for any petition to revise the List of Endangered and Threatened Wildlife and Plants that contains substantial scientific or commercial information, the Service should make a finding within 12 months of the date of receipt of the petition on whether the petitioned action is (a) not warranted, (b) warranted, or (c) warranted, but precluded from immediate action by other pending proposals.

Dr. Flavius Killebrew, Department of Biology and Geosciences, West Texas State University, Canyon, Texas, submitted a petition to the Service to list the Cagle's map turtle as a threatened species. The petition was dated April 16, 1991, and received by the Service on April 26, 1991. A 90-day determination that the action requested

may be warranted was announced in the **Federal Register** on December 16, 1991 (56 FR 65209).

Distribution and Biology of Cagle's Map Turtle

Cagle's map turtle is a river turtle and is restricted to riverine habitat (Killebrew 1991a). This turtle is endemic to the Guadalupe River system. Cagle's map turtle is currently found only in segments of the Guadalupe and San Marcos Rivers in Kerr, Kendall, Comal, Guadalupe, Gonzales, Dewitt, and Victoria Counties in southeast central Texas (Killebrew 1992, Killebrew and Porter 1991, Porter 1992).

The current distribution of Cagle's map turtle is in three river segments: (a) The upper Guadalupe River from Kerrville to Seguin, (b), the middle Guadalupe River from Seguin to Cuero (including the San Marcos River from Ottine to its confluence with the Guadalupe River), and (c) the lower Guadalupe River from Cuero to Victoria. The distribution is based on surveys using time-constrained basking turtle frequency indices and mark-recapture studies (Killebrew 1991a, Killebrew 1991b, Porter 1992).

The populations in the upper Guadalupe River are small and disjunct (Killebrew 1991a). From Kerrville downstream to Canyon Lake, populations are described as minimal and unevenly distributed (Killebrew 1991a). Cagle's map turtle is absent from Canyon Lake proper and virtually absent in the segment from Canyon Dam downstream to New Braunfels (Killebrew 1991a). Five impoundments on the Guadalupe River (Lake Dunlap, Lake McQueeny, Lake Placid, Starcke Park Lake, and Meadow Lake) occur between New Braunfels and Seguin. In this segment, Cagle's map turtle occurs only in small populations in a 7.5 km (4.6 mile) section where riverine conditions exist (Killebrew 1991a).

The middle Guadalupe supports the main population of this species consisting of the Guadalupe River between the towns of Seguin and Cuero (about 233 river-km or 144 river-miles), (Killebrew 1991a). About 60 to 70% of the species is estimated to occur between Seguin and Cuero, constituting the largest continuous distribution of the species (Flavius Killebrew, West Texas State University, pers. comm., 1992). A smaller population has been noted on the San Marcos River in Gonzales County (Porter 1992).

The Guadalupe River from Cuero to Victoria marks the southern extent of the distribution of *G. caglei*. The number of Cagle's map turtles decrease going downstream from Cuero, and disappear in the vicinity of Victoria (Killebrew 1991a, Killebrew 1992).

Habitat requirements for Cagle's map turtle are exemplified by the Guadalupe River between Seguin and Cuero where the "river bed is mostly silt and gravel" and "gravel bars connecting long pool areas with a shallow average depth and a muddy, moderate flow" (Killebrew 1992). Basking habitat is provided by fallen trees and shrubs, logs, rocks and cypress knees (Haynes and McKown 1974, Killebrew 1992).

Cagle's map turtle has distinct size differences between the sexes. The adult male upper shell (carapace) length averages 7 to 12 cm (3 to 5 in.), while those of females are generally larger and may attain sizes up to 20 cm (8 in) (Conant and Collins 1991, Haynes 1976, Haynes and McKown 1974, Killebrew and Porter 1989, Killebrew and Porter 1990). Little is known regarding reproduction in this species. Haynes and McKown (1974) collected hatchling turtles from September through November and surmised that Cagle's map turtle nesting period occurs in late spring and early summer. Nesting habits in this species are not well known. One observed nesting took place on a sand bar (Killebrew, pers. comm., 1992). However, Haynes and McKown (1974) reported that sand bars are virtually nonexistent in many reaches of the Guadalupe River and concluded that nesting habits in Cagle's map turtle may differ from other species of *Graptemys* that often nest on sandbars.

Cagle's map turtle is highly aquatic, and optimal habitat appears to include both riffles and pools (Haynes and McKown 1974, Killebrew 1991a, Killebrew 1992). Riffles are a section of a stream/river where the water is usually shallower and the current is of greater velocity than in the connecting pools. Gravel bar riffles and transition areas between riffles and pools are considered to be important for Cagle's map turtles since these areas are considered to be highly productive of inset prey items of Cagle's map turtle (Killebrew 1991a, Killebrew 1991b). Recent radiotelemetry studies indicate males may spend most of their time in these areas (Killebrew 1991b).

Killebrew (1991b) described Cable's map turtle feeding ecology, including seasonal, size-specific, and sex-specific diet differences. This study took place near Cuero in the southern part of the range. Adult males fed primarily on insects (81% of gastrointestinal contents by weight were insects) while adult females fed primarily on mollusks (88% of gastrointestinal contents by weight were Asiatic clam, *Corbicula fluminea*) (Killebrew 1991b). The Asiatic clam, a non-native species, escaped into Texas rivers sometime between 1970 and 1973 (B. McMann, University of Texas at Arlington, pers. comm., 1992).

Male Cagle's map turtles feed extensively (45% gastrointestinal contents by weight) on trichopteran (caddisfly) larvae of the genus *Nectopsyche* (Killebrew 1991b). Killebrew (1991b) also described other insect prey for Cagle's map turtles of both sexes, including mayfly nymphs, damselfly nymphs and adults, dragonfly nymphs and adults, stonefly nymphs, and spongillafly larvae. Male juveniles fed on nearly equal quantities of snails and insects while female juveniles ate nearly equal quantities of Asiatic clams and insects (Killebrew 1991b).

Haynes and McKown (1974) examined food items in several juvenile and adult males and two subadult females collected in July. They reported a diet of insects for both sexes (mostly caddisflies). Juveniles had also eaten large number of small gnat-like dipterans. The females had eaten cadisflies and snails. Lehmann (1979) reported both sexes as insectivorous, primarily consuming caddisflies and odonates (Dragonflies and damselflies). The studies of Haynes and McKown (1974) and Lehmann (1979) involved small sample sizes and collections during a one or two month period.

Threats to Cagle's Map Turtle

Cagle's map turtle warrants protection under the Act for the following reasons: (1) Cagle's map turtle has an extremely limited distribution; (2) within its current range, suitable habitat for Cagle's amp turtle is fragmented and becoming more scarce. Cagle's map turtle faces further losses of suitable habitat from proposed impoundments and water diversions; (3) Cagle's map turtles diet of aquatic invertebrates (particularly insects) may be adversely affected by altered instream flow, pollution and increased sedimentation; and (4) human depredation is occurring in the from of intentional shootings and over-collecting for the pet trade, zoos, museums, and scientific studies (Killebrew 1991a, Killebrew 1992). These factors are discussed below.

Cagle's map turtle is a restricted endemic species, occurring only in segments of the Guadalupe River and a small contiguous reach of the San Marcos River. Mark-recapture studies on a 27 km (17 mi) segment of the Guadalupe River near Cuero indicates that the population in the study area is stable (Killebrew 1992). The populations in the upper Guadalupe River are vulnerable due to their limited size and disjunct distribution.

The validity of historic records from the San Antonio River system (Dixon 1987, Haynes 1976, Haynes and McKown 1974) is uncertain (Porter 1992). The holotype and paratype specimens were from the Guadalupe River (Haynes and Mckown 1974) and only a few sight records were reported from the San Antonio River system. A recent survey of the San Antonio did not find any Cagle's map turtles (Porter 1992).

Historic records of Cagle's map turtle from the Blanco River and San Marcos River above Ottine exist, but this species was not found in those reaches during recent field work (Killebrew, pers. comm., 1992, Porter 1992).

Cagle's map turtle faces further riverine habitat losses and degradation in the form of small and/or large impoundments and water diversions. Cagle's map turtle is absent from deep water/non-riverine habitat in its range (Killebrew 1991a).

Cagle's map turtles occur where the Guadalupe River empties into Canyon Lake (an 8,240 acre reservoir) and they occur above the reservoir but not in the lake proper (Killebrew 1991a). The water released from the deeper and cooler portion of Canyon Lake may decrease the suitability of riverine habitat for Cagle's map turtle below Canyon Dam. Cagle's may turtle has been observed in only one small, warm pool between Canyon Lake and New Braunfels (Killebrew 1991a).

One effect of impoundment is the loss of riffle and riffle/pool transition areas used by males for foraging. Depending on its size, a dam itself may be a partial or complete barrier to Cagle's map turtle movement and could fragment a population. Construction of smaller impoundments and human activities on the river have likely eliminated or reduced foraging and basking habitats. Since Cagle's map turtle appears not to persist in lentic or lacustrine (lake-like) conditions (Killebrew 1992), impoundments reduce total habitat area and suitability, as well as fragment remaining habitat.

Proposed impoundments on the Guadalupe River and certain tributaries would adversely affect the Cagle's map turtle. The Texas Water Development Board (1990) recommended two reservoir sites (Lindenau and Cuero) in the Guadalupe River basin be developed to meet regional water supply needs. The proposed Cuero Reservoir would eliminate over half of the suitable habitat used by the main population (Killebrew 1991a). The Cuero Reservoir could be completed about 10 years from the time reservoir development begins in earnest. Other proposed reservoirs in the Guadalupe River system include: (a) Upper Guadalupe Reservoir; (b) Ingram Reservoir; (c) Lindenau Reservoir; (d) Clopton Crossing Reservoir; and (e) Lockhart Reservoir (Frye and Curtis 1990, Texas Water Development Board 1990). None of these reservoirs are on the Guadalupe River proper, but their construction would have effects on the Guadalupe River, its flow and physical habitat, existing Cagle's map turtle habitats, and the potential for species recovery in tributaries of the Guadalupe River. The City of San Antonio is currently examining alternate water supplies and is considering transfers from the Guadalupe River Basin and elsewhere to meet their needs. Water diversions from the Guadalupe River may affect Cagle's map turtle habitat in various ways depending upon how much water is diverted and how the diversion is accomplished. Although dams and reservoirs have high potential to impact Cagle's map turtle, construction of these impoundment projects is not occurring at this time and do not constitute an immediate or ongoing threat.

The distribution and abundance of Cagle's map turtles's prey base of aquatic insects may be affected by the proposed impoundments or diversions noted above. Male Cagle's map turtles feed extensively on caddisfly larvae of the genus *Nectopsyche* (Killebrew 1991b). This caddisfly genus has been identified as sensitive to and intolerant of organic/nutrient pollution (Hilsenhoff 1987). Other Cagle's map turtle insect prey items (described above) have been characterized as sensitive to organic pollution and other environmental changes (U.S. Environmental Protection Agency 1990). These insect groups (mayflies, stoneflies, and odonates) are likely to be adversely affected by increased organic waste/nutrient pollution or water quality degradation.

The availability of the Asiatic clam as a food item for female Cagle's map turtles is likely to be variable in time and space. The Asiatic clam is known for its explosive population growth and massive mortalities (die-offs) (Sinclair 1971) and is vulnerable to flooding (B. McMann, pers. comm., 1992). Dependence on this unreliable food source may further reduce population viability for Cagle's map turtle.

Currently, the cities of New Braunfels and Seguin are major point sources of treated municipal wastewater on the Guadalupe River, permitted for a combined discharge of 10.23 million gallons per day (MGD). Two more wastewater treatment plants in the area are planned with a combined permitted discharge of about 5 MGD. The capability of the Guadalupe River to assimilate this and other nutrient loading depends on the amount of steam flow.

Cagle's map turtles are threatened by human depredation in the form of over-collecting for the pet trade and intentional shootings (Killebrew, pers. comm., 1991, Killebrew 1991a, Killebrew 1992). Dealers in the pet trade are evidently selling Cagle's map turtles to wholesalers and have offered $50 per hatchling and $400 per breeding pair to map turtle collectors (Killebrew, pers. comm., 1991). Regulation of this commercial exploitation is minimal at the State level and there are no Federal regulations. State law requires only a hunting license to collect, shoot, sell, or trade Cagle's map turtle. Currently, exportation of Cagle's map turtles require only a declaration to the Fish and Wildlife Service at Ports of Entry. About 5% of individuals handled in the field have shell deformities indicative of shootings (Killebrew, pers. comm., 1992).

Section 4(b)(3)(B) of the Endangered Species Act requires that the Service make one of the following 12-month findings on any petition presenting substantial information: (i) The petitioned action is not warranted; (ii) the petitioned action is warranted and will be proposed promptly; or (iii) the petitioned action is warranted but is precluded by other efforts to revise the lists, and expeditious progress is being made in listing and delisting species. Section 4(b)(3)(B)(ii) requires that petitions for which the action requested is found to be warranted will be promptly published in the **Federal Register** along with a general notice and complete text of a proposed regulation to implement such action.

On the basis of the best available scientific and commercial information and the following assessment of Service listing priorities and progress, the Service finds that listing of Cagle's map turtle is warranted, but precluded by work on other species having higher priority for listing. Although the degree of threat to the species from impoundment projects is high, it is not an ongoing or imminent threat. Degrading water quality from pollution and human depredation is ongoing, but these threats by themselves would not cause the species to go extinct. The Service is expeditiously working on listing a backlog of species having higher priority for protection under the Endangered Species Act. The Service intends to list this species as soon as listing actions for species with a higher listing priority are completed. (With this petition finding of warranted but

precluded, Cagle's map turtle will be assigned to Category 1 on the Service's Animal Notice of Review.)

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Author

The primary author of this notice is Patrick Connor (see **ADDRESSES** above).

Authority

The authority for this action is 16 U.S.C. 1531–1544.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Dated: January 4, 1993.

Richard N. Smith,

Acting Director, Fish and Wildlife Service.

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